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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,711	03/29/2005	Jill MacDonald Boyce	PU030225	2040

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JOSEPH J. LAKS, VICE PRESIDENT
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EXAMINER

AN, SHAWN S

ART UNIT PAPER NUMBER

2621

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/10/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.		Applicant(s)	
	10/529,711		BOYCE, JILL MACDONALD	
	Examiner		Art Unit	
	Shawn S. An		2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-9,11,13 and 14 is/are rejected.
- 7) ☒ Claim(s) 2,10 and 12 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. As per Applicant's instructions as filed on 1/29/07, claims 1, 9, and 14 have been amended.

Response to Remarks

2. Applicant's remarks as filed on 1/29/07 with respect to currently amended claims have been carefully reviewed but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 3-9, 11, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Etoh (6,081,551) in view of Odaka et al (5,467,136).

Regarding claim 1, Etoh discloses a video encoder (Fig. 1) for encoding video signal data for an image block and a plurality of reference picture indices, comprising a reference weighting factor assignor (22a, 22b) responsive to the relative position between the image block (Input Image to 22a and 22b via 21a and 21b, respectively) and first and second reference pictures indicated by the plurality of reference picture indices (23, 24), wherein the reference picture weighting factor assignor determines respective implicit weighting factors for the first and second reference pictures (Fig. 5).

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Etoh does not particularly disclose calculating respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures.

However, Odaka et al teaches a video coding apparatus which forms an optimum prediction signal which is designated by a set of motion vectors of separate reference pictures comprising calculating respective implicit weighting factors (Fig. 1, 31-32) for the first (15) and second (16) reference pictures based on respective distances (Fig. 26, n and n-1) of the image block to the first and second reference pictures for preventing a deterioration in prediction performance (col. 7, lines 29-47; col. 21, lines 20-45).

Therefore, it would have been obvious to a person of ordinary skill in the relevant art employing a method for encoding video signal data for an image block as taught by Etoh to incorporate Odaka et al's teachings as above so as to calculate respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures for preventing a deterioration in prediction performance.

Regarding claim 3, Etoh discloses a reference picture store (23, 24) in communication with the reference weighting factor assignor for providing a reference picture corresponding to each reference picture index.

Regarding claim 4, Etoh discloses a VLC (12) in communication with the reference weighting factor assignor for encoding the first and second reference picture indices.

Regarding claim 5, Etoh discloses a MC unit (22a, 22b) in communication with the reference weighting factor assignor for providing motion compensated reference pictures responsive to the reference weighting factor assignor.

Regarding claim 6, Etoh discloses a multiplier (Fig. 5, multiplying by 1/8) in signal communication with the MC unit and the reference weighting factor assignor for applying a weighting factor to a motion compensated reference picture (col. 8, lines 11-23).

Regarding claim 7, Etoh discloses prediction means (25) for forming first and second predictors (see switch selector, 27) from two different reference pictures.

Regarding claim 8, Etoh discloses two different reference pictures being both from the same direction relative to the image/picture block (Fig. 12).

Regarding claim 9, Etoh discloses a method for encoding video signal data for an image block, comprising:

receiving a substantially uncompressed image block (Fig. 1, Input Image);

determining implicit weighting factors (22a, 22b; Fig. 5) for the image block responsive to the relative positioning between the image block (Input Image to 22a and 22b via 21a and 21b, respectively) and first and second reference pictures indicated by the plurality of reference picture indices (23, 24);

computing motion vectors (21a, 21b) for the image block and each of the first and second reference pictures;

motion compensating (22a, 22b) each of the first and second reference pictures in correspondence with the respective motion vectors;

multiplying (Fig. 5, multiplying by 1/8) each of the motion compensated reference pictures by its calculated implicit weighting factor to form a weighted motion compensated reference picture (col. 8, lines 11-23);

combining each of the weighted motion compensated reference pictures into a combined weighted motion compensated reference picture (22a, 22b);

subtracting (10) the combined weighted motion compensated reference picture from the substantially uncompressed image block; and

encoding (5, 6) a signal indicative of the difference between the substantially uncompressed image block and the combined weighted motion compensated reference picture along with the corresponding indices of the first and second reference pictures.

Etoh does not particularly disclose calculating respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures.

However, Odaka et al teaches a video coding apparatus which forms an optimum prediction signal which is designated by a set of motion vectors of separate reference pictures comprising calculating respective implicit weighting factors (Fig. 1, 31-32) for the first (15) and second (16) reference pictures based on respective distances (Fig. 26,

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n and n-1) of the image block to the first and second reference pictures for preventing a deterioration in prediction performance (col. 7, lines 29-47; col. 21, lines 20-45).

Therefore, it would have been obvious to a person of ordinary skill in the relevant art employing a method for encoding video signal data for an image block as taught by Etoh to incorporate Odaka et al's teachings as above so as to calculate respective implicit weighting factors for the first and second reference pictures based on respective distances of the image block to the first and second reference pictures for preventing a deterioration in prediction performance.

Regarding claim 11, Etoh discloses determining MV for the retrieved reference pictures relative to the image block (21a, 21b).

Regarding claim 13, Etoh teaches the relative positioning of an ordinary frames and the plurality of template pictures/frames corresponds to the relative display times of the respective pictures/frames (Fig. 21).

Therefore, it would have been considered obvious to one of skill in the art to realize that the relative positioning of the image block and the plurality of reference pictures/frames corresponds to the relative display times of the respective pictures/frames to be in sync, so that there is no interruption in displaying the respective image block and the plurality of reference pictures/frames in proper order/sequence.

5. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Etoh and Odaka et al as applied to claim 9 above, and further in view of Bellers (6,782,054 B2).

Regarding claim 14, Etoh discloses testing within a search region for every displacement within a pre-determined offsets relative to the image block (Fig. 19a; col. 2, lines 18-48), and calculating SAD (26) of each pixel in the image block with a motion estimated reference picture.

Etoh does not particularly disclose selecting the offset with the lowest SAD and mean squared error as the motion vector.

However, Bellers teaches method and apparatus for MV estimation, wherein a block matching algorithm on the basis of regions or blocks for which a MV is being

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searched by comparing the pixel value contained in these blocks, and the evaluation is accomplished by using an error function such as SAD or means squared error, and the vector yielding the smallest (lowest) error is selected as the best match providing the best motion vector (col. 2, lines 62-67; col. 3, lines 1-12).

Therefore, it would have been considered obvious to a person of ordinary skill in the relevant art employing a method for encoding video signal data for an image block as taught by Etoh to incorporate Bellers' teachings as above so as to select the offset with the lowest SAD and mean squared error as the (best) motion vector for providing an improved motion estimation.

Allowable Subject Matter

6. Claims 2 and (10, 12) are objected to as being dependent upon rejected base claims 1 and 9, respectively, but would be allowable:

if claim 2 is rewritten in independent form including all of the limitations of the base claim 1 and any intervening claims; and

if either claim 10 or claim 12 is rewritten in independent form including all of the limitations of the base claim 9 and any intervening claims.

Dependent claims 2, 10, and 12 recite novel features, wherein the prior art of record fails to anticipate or make obvious the novel features.

Accordingly, if the amendments are made to the claims listed above, the application would be placed in condition for allowance.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not

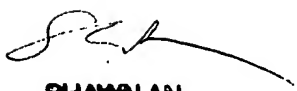
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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the Examiner should be directed to *Shawn S An* whose telephone number is 571-272-7324.

9. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

10. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


SHAWN AN
PRIMARY EXAMINER

4/03/07